

What is claimed is:

1. An electrical energy storage device, comprising:

- 5       a) a casing housing an anode and a cathode in electrochemical association with each other;
- b) a protective housing mounted on the casing, wherein the protective housing comprises a base with an aperture therethrough for receiving a terminal pin electrically connected to one of  
10       the anode and the cathode, a projecting shoulder extending from the base to a first distance from the base, and a retaining clip extending from the base to a second distance from the base, the second distance being greater than the first  
15       distance;
- c) a circuit board supported on the base of the protective housing and comprising a first lead electrically connected to the terminal pin;
- d) a terminal cap captured between the projecting  
20       shoulder and the retaining clip to close the protective housing with the circuit board housed therein;
- e) a first ledge provided at a periphery of the protective housing base;
- 25       f) a surrounding member having an inner wall and an outer wall, wherein the inner wall of the surrounding member captures an outer wall of the protective housing; and
- g) a polymeric material securing an outer wall of  
30       the surrounding member to the cell casing.



2. The electrical energy storage device of claim 1 wherein there are a plurality of projecting shoulders and a plurality of retaining clips provided about a circumference of the base in an alternating configuration.

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3. The electrical energy storage device of claim 1 further comprising a compressible pad intermediate the circuit board and the terminal cap.

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4. The electrical energy storage device of claim 3 wherein the compressible pad is a silicone-based material.

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5. The electrical energy storage device of claim 1 wherein the surrounding member is a ring that overlays a first ledge of the protective housing.

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6. The electrical energy storage device of claim 1 wherein the surrounding member is a ring having a second ledge overlaid by polymeric material.

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7. The electrical energy storage device of claim 6 wherein the polymeric material is an annular member characterized as having been heat-shrunk into contact with the outer wall of the surrounding member and the cell casing.



8. The electrical energy storage device of claim 1 wherein the cell casing has a cylindrical outer wall extending between a bottom wall and an open upper end closed by a header and wherein the polymeric material is in a surrounding contact relationship with at least a portion of the cylindrical outer wall of the casing and a second ledge portion of the surrounding member.

9. The electrical energy storage device of claim 1 wherein the terminal cap is a conductive member and a second lead from the circuit board connects to the terminal cap.

10. The electrochemical energy storage device of claim 1 wherein a third lead from the circuit board is electrically connected to a second cell terminal for the other of the anode and the cathode not electrically connected to the terminal pin.

11. A method for securing a protective housing for a circuit board to a casing of an electrochemical cell, comprising the steps of:

- a) providing the protective housing comprising a base with an aperture therethrough for receiving a terminal pin electrically connected to one of an anode and a cathode in electrochemical association with each other housed inside the casing, a projecting shoulder extending from the base to a first distance from the base, and a retaining clip extending from the base to a



second distance from the base, the second distance being greater than the first distance;

- b) supporting the circuit board on the base of the protective housing and electrically connecting a first lead of the circuit board to the terminal pin of the cell;
- c) closing an open end of the protective housing by moving a terminal cap into a position captured between the projecting shoulder and the retaining clip;
- d) determining a distance between a first outer wall of the protective housing and a second outer wall of the casing;
- e) selecting a surrounding member from a group of variously sized surrounding members, wherein the selected surrounding member is sized to capture a portion of the protective housing and to have its outer wall adjacent to the casing outer wall; and
- f) securing the outer wall of the surrounding member to the casing with a polymeric member.

12. The method of claim 11 including providing the base having a plurality of projecting shoulders and a plurality of retaining clips disposed about a circumference of the base in an alternating configuration.

13. The method of claim 11 including positioning a compressible pad intermediate the circuit board and the terminal cap.



14. The method of claim 11 wherein the surrounding member is a ring overlaying a first ledge of the protective housing.

5 15. The method of claim 11 wherein the surrounding member is a ring and including overlaying a second ledge of the ring with a polymeric material.

10 16. The method of claim 15 wherein the polymeric material is an annular member and heating the polymeric material thereby causing it to shrink down and into securing contact with the outer wall of the surrounding member and the cell casing.

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18. The method of claim 15 wherein the cell casing has a cylindrical outer wall extending between a bottom wall and an open upper end closed by a header and heating the polymeric material thereby causing it to shrink down and into securing contact with the cylindrical outer wall of  
20 the casing and the outer wall of the surrounding member.

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19. The method of claim 11 wherein the terminal cap is a conductive member and connecting a second lead from the circuit board to the terminal cap.

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20. The method of claim 11 including electrically connecting a third lead from the circuit board to a second cell terminal for the other of the anode and the cathode not electrically connected to the terminal pin.



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A method for securing a protective housing for a circuit board to a casing of an electrochemical cell, comprising the steps of:

- 5           a)    providing the casing comprising a cylindrical outer wall extending between a bottom wall and an open upper end closed by a header;
- b)    providing the protective housing comprising a base having an aperture therethrough for receiving a terminal pin electrically connected  
10           to one of an anode and a cathode in electrochemical association with each other housed inside the casing when the protective housing is mounted on the cell header, wherein the protective housing comprises a plurality of  
15           projecting shoulders extending from the base to a first distance from the base, and a plurality of retaining clips extending from the base to a second distance from the base, the second distance being greater than the first distance;
- 20           c)    supporting the circuit board on the base of the protective housing and electrically connecting a first lead of the circuit board to the terminal pin of the cell;
- d)    positioning a compressible pad resting on the  
25           circuit board and surrounded by the plurality of projecting shoulders and retaining clips;
- e)    closing the protective housing by moving a terminal cap against the compressible pad and into a position captured between the plurality  
30           of projecting shoulders and the retaining clips;



- f) electrically connecting a second lead from the circuit board to the terminal cap;
- g) electrically connecting a third lead from the circuit board to the other of the anode and the cathode not electrically connected to the terminal pin;
- h) determining a distance between a first outer wall of the protective housing and a second outer wall of the casing;
- i) selecting a ring-shaped member from a group of variously sized ring-shaped members, wherein the selected ring-shaped member is sized to capture a first outer ledge of the protective housing with a second ledge at its outer wall adjacent to the casing outer wall;
- j) positioning an annular in a position surrounding the second ledge of the selected ring-shaped member and the cylindrical outer wall of the cell casing; and
- k) heating the polymeric material and thereby causing it to shrink down and into securing contact with the second ledge and the casing outer wall.